monly occur in the ends of long bones they may at times occur in flat bones. We have recently had the opportunity to see two cases within the past year, one of a typical roentgen picture of giant cell sarcoma in the ilium, and a second one in the wing of the sacrum.

Doctors Bowman and Goin have mentioned the fact that these giant cell tumors throw out new bony growth after a fracture which results in a healing process. This same new bony growth and healing can many times be produced by radiation therapy.

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HENRY SNURE, M. D. (1501 South Figueroa Street, Los Angeles)—Doctors Bowman and Goin have completely covered all the essential points in the x-ray diagnosis of bone tumors. About all that can be added are the rare types and locations of some of the tumors, such as the giant cell tumors mentioned by Doctor Bryan. I have recently x-rayed a case of giant cell tumor of a flat bone, namely, the sacrum, diagnosis verified by tissue section.

A year ago I had the opportunity of reviewing films of bone tumor in Doctor Keinbock's Clinic in Vienna. Doctor Keinbock has been collecting these cases for years, and I found that the cardinal points of Baetjer as outlined in this paper gave a correct diagnosis in all but a few cases (excepting, of course, tumors where there had been surgical intervention, fracture or tumors too extensive to determine point of origin). However, five cases that appeared to be typical benign bone cysts of femur by x-ray examination were shown by tissue section to be slow-growing metastatic carcinoma from the thyroid gland. Doctor Keinbock stated that 4 per cent of his cases of typical Paget's disease from x-ray viewpoint developed a metastasis of the periosteal sarcoma type. A few cases of dystrophy greatly resembled metastatic malignancy, but here again the law of ages was helpful in most cases.

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WILLIAM H. SARGENT, M. D. (2490 Channing Way, Berkeley)—Doctors Bowman's and Goin's excellent presentation of the roentgen differentiation of bone tumors is liable to give one the impression that it is rather simple to distinguish between the benign and the malignant. Unfortunately it is quite otherwise in a considerable percentage of the cases. All of us have felt the weight of responsibility as we have gazed at the x-ray film of a confusing or doubtful bone condition.

Some time ago we sent films of a case which was thought to be a giant cell tumor of the ischium to the Registry of Bone Sarcoma. The subsequent course was typical of malignancy. We also recently saw a case with erosion of the cortex and a slight amount of new bone formation which has been variously diagnosed for the last six months, and still no general agreement.

In other words, while the various points so clearly outlined by the writers are of very great assistance, in a certain percentage of the cases the x-ray is not conclusive. All sources of information, such as the history, clinical findings, and Wassermann, must be carefully considered with the roentgen findings. A biopsy should not be done unless with tourniquet in place and an immediate amputation follows if the gross appearance of the tissue suggests malignancy.

Until recently we have had no place to which we could turn for well-crystallized information regarding bone tumors, but with the Registry of Bone Sarcoma well organized and functioning, we should all now become better informed about these comparatively rare conditions.

Cooperation with the registry and general adoption of its classification and nomenclature is highly desirable.

THE USE OF ALCOHOL AS A STANDARD GASTRIC TEST MEAL

By GARNETT CHENEY, M. D.

San Francisco

DISCUSSION *by W. W. Boardman, M. D., San Francisco; V. R. Mason, M. D., Los Angeles; Elbridge J. Best, M. D., San Francisco.*

THIRTEEN years ago Ehrmann[1] tried the effects of alcohol on gastric secretion, and since that time several investigators have used an alcoholic meal in the study of gastric physiology. However, it has received no attention as a standard stimulus in fractional gastric analysis in this country, and very little abroad; the Ewald meal or cereal gruels usually being employed. Gross and microscopic examinations of stomach contents, fasting, and after various meals, are of recognized importance in the diagnosis of gastric disorders, but the marked variations in types of acid curves in health and the inaccuracy of the methods for their determination have caused some doubt as to the value of acidity estimations. As marked hyperacidity and complete absence of free HCl are fairly constant and characteristic findings in certain diseases affecting the stomach, fractional gastric analysis maintains a place as a procedure in thorough gastro-intestinal investigations. This seems to justify an endeavor to simplify the technique of administration of the meal and to minimize sources of error, where in hospital routine it is often necessary to have untrained nurses and medical students carry out the tests.

TECHNIQUE

The technique which is used on clinical wards and on diagnostic group service is similar to that of any other test-meal. Early in the morning, after twelve hours' fasting, a Rehfuss tube is passed and all the stomach contents are removed. The meal, consisting of 100 cc. 7 per cent alcohol, is then injected into the stomach through the tube and samples are withdrawn at one-half hour intervals up to one and one-half hours after the meal. This length of time is considered sufficient, as Bell[2] found that maximum acidity was reached in one and one-half hours in all types of acid curves except a few high normals. There is no stoppage of the tube by bits of food, the specimens are clear, and small amounts of bile, blood or mucus are readily recognized. The microscopic examination of the sediment and tests for blood and lactic acid are readily carried out, and it is not necessary to filter the contents to read the acid determinations with Topfer's reagent and with phenolphthalein. There are no food particles by which one may gauge the rate of emptying of the stomach after the meal which might be considered an argument against the use of alcohol. However, gastric x-ray studies and Bloomfield and Keefer's[3] method for the continuous quantitative estimations of gastric secretion give really accurate information on this point and show the rate

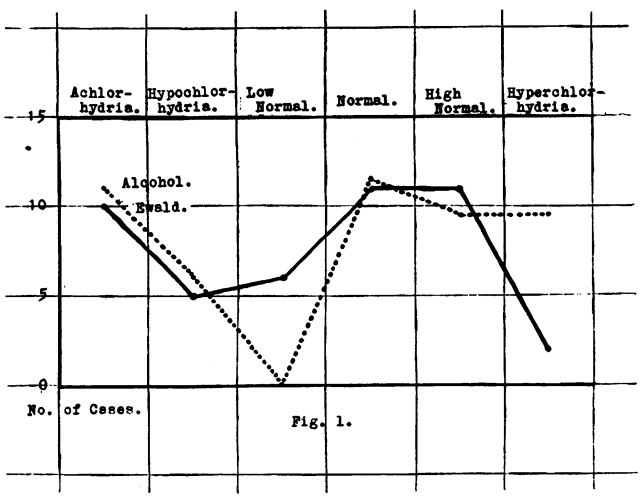
TABLE 1—*Comparison of Gastric Acidity in Fifty Patients Receiving Both an Ewald and an Alcoholic Test-Meal*

Meal	Achlor-hydria	Hypochlor-hydria	Low Normal	Normal	High Normal	Hyperchlor-hydria
Ewald	10	5	7	12	12	4
Alcohol	12	7	0	13	9	9

of emptying to be inconstant even in the same individual.

COMPARISON WITH OTHER METHODS

In suggesting the substitution of a new type of routine test-meal for others that have been widely used, comparisons must be carried out and analyzed. In a series of 150 fractional alcoholic test-meals in a miscellaneous group of cases ranging in age from 14 to 78 years requiring gastro-intestinal investigations, fifty unselected patients received a second fractional analysis following the administration of an Ewald meal. This group received the two meals within a few days of each other and under the same conditions and the findings are presented in Table 1, and graphically in



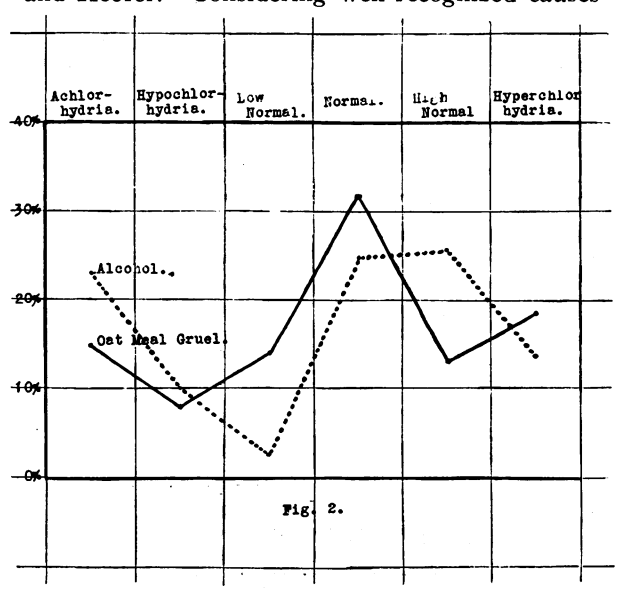
Graphic representation of findings in Table 1.

Fig. 1. The types of free acid curves have been divided into six groups according to the classification followed by Kohiyar.[4] The six groups are: (1) Complete achlorhydria. (2) Hypochlorhydria where the free HCl does not exceed 10 degrees. (3) Low normal where the free HCl is between 10 and 16 degrees. (4) Normal acidity where the free HCl is between 16 and 30 degrees. (5) High normal where the free acidity may reach 60 degrees. (6) Hyperchlordria where the free HCl rises above 60 degrees. This is an arbitrary division, but offers a fairly just basis for comparison between the two different types of meal. One must recognize that there is a considerable degree of variation in the acid curve in response to the same type of meal on successive occasions. Twenty-three double meals produced exactly the same types of curves. Five Ewald meal HCl titrations showed sufficient increase of acid over the comparable alcoholic meal titrations to place the curve in the group just above, while three titrations showed an increase of acid sufficient to place them in the second group above, and one in the third group above. Conversely fifteen alcoholic meal HCl titrations increased the acidity to one higher group, one to a group two higher, one to a group three higher, and one to a group four higher.

As it was thought that the slightly higher acid values obtained with the alcoholic meal might depend on the combination of free HCl with the cereal substance of the other meals a "laboratory test-meal" was prepared and samples titrated for acidity. Two glasses of water and two slices of toast well broken up were placed in a beaker. Twenty cc. of decinormal HCl was added at intervals while stirring the mixture, and it was not until after 80 cc. had been added that a positive reaction for free HCl could be obtained. Immediate titrations of gastric juice withdrawn one-half and one and one-half hours after an Ewald meal did not materially differ in acidity from titrations performed up to twenty-three hours after the meal.

INTERPRETATION OF TABLES

Table 2 shows a comparison of types of gastric HCl curves in the group of 150 patients receiving alcohol, and Kohiyar's[4] series of 1080 on similar subjects who received oatmeal gruel as a test-meal. Fig. 2 shows this graphically. Although the results appear somewhat dissimilar this is readily accounted for if one notes certain differences in the case groups studied. The 23 per cent achlorhydrias in the smaller series is close to the 26 per cent reported in 1500 cases by Bloomfield and Keefer.[5] Considering well-recognized causes



Graphic representation of findings in Table 2.

TABLE 2—*Comparison of Gastric Acidity in Response to Oatmeal Gruel and to Alcohol*

	Achlorhydria	Hypochlorhydria	Low Normal	Normal	High Normal	Hyperchlorhydria
Oatmeal Gruel 1080 Cases	159=14.7%	86=8%	151=14%	340=31.5%	143=13.2%	201=18.6%
Alcohol 150 Cases	35=23%	16=10%	4=2.7%	37=24.7%	38=25.3%	20=13.3%

of achlorhydria, advanced cancer of the stomach, pernicious anemia, and combined sclerosis of the spinal cord, constitute 7.3 per cent of the smaller group, while the per cent of similar cases for the larger group is less than half this, or 3.6 per cent. Taking the three normal groups as one, the per cent for the small group is 52.7 and for the large, 58.7. The somewhat higher hyperchlorhydria figure is from a series including 14.9 per cent of peptic ulcers, while the incidence of ulcer in the 150 cases is 11.3 per cent.

In observing the free HCl acid values recorded in sixty-five alcoholic test-meals by the method of Bloomfield and Keefer where the meal consists of 50 cc. of 7 per cent alcohol and samples are withdrawn at 10-minute intervals, the maximum acid value was always reached within 60 minutes except in two cases in which 65-minute samples were recorded. The acidity in these two was but a few degrees higher than in the preceding specimens. In twenty cases of this group the patients also received the alcoholic test-meal of 100 cc. of 7 per cent alcohol, and in none of them did the height of the acid curve exceed that of the smaller meal. Indeed the smaller meal gave constantly higher acid values, undoubtedly due to less dilution of the gastric secretion. In accordance with these findings it is felt that a small meal with frequent extractions over a short period of time will give all the important information obtainable by any of the longer methods now in general use. The routine fractional gastric test-meal now adopted consists of 50 cc. of 7 per cent alcohol with removal of samples at the end of 15, 30, 45, and 60 minutes. The fasting contents are removed before the meal.

CONCLUSIONS

1. The use of alcohol as a meal in fractional gastric analysis is recommended.
2. The technique of obtaining and analyzing samples is simpler and the acid values are slightly more accurate than when a cereal meal is used.
3. The acid curves are quite comparable to those obtained with other types of gastric stimulants.
4. A meal of 50 cc. of 7 per cent alcohol followed by withdrawal of four samples at subsequent 15-minute intervals will give as adequate information as may be obtained by a longer procedure.

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DISCUSSION

W. W. BOARDMAN, M. D. (350 Post Street, San Francisco)—Doctor Cheney has called attention to a procedure that greatly simplifies the clinical study of the secretory activity of the stomach. This is an essential part of every careful study of gastric function, but we are not so concerned with the actual percentage of acid found as we are with the general type of reaction of the gastric mucosa to a given stimulus.

The fractional meal has proven itself more reliable than the old Ewald meal, but especially in office work it introduced various difficulties, such as the administration of the meal after extracting the fasting content, and the fairly frequent obstruction of the tube by particles of the meal, etc.

Because of these difficulties I have utilized a meal of 50 cc. of 7 per cent alcohol with three extracts at 20-minute intervals during the past two years, and can therefore confirm Doctor Cheney's conclusion that the alcohol acts as a satisfactory stimulant to gastric secretion and that its use simplifies the procedure of gastric analysis.

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V. R. MASON, M. D. (838 Pacific Mutual Building, Los Angeles)—During the past years we have seen the development of standard gastric test-meals, motility meals, so-called "normal" meals and secretory meals and, after a prodigious amount of work, many observers concluded that these procedures, while giving necessary information in certain instances, added little or no useful data in other cases and at times led to error. But the analysis of gastric contents is a necessary part of many gastro-intestinal studies. For this purpose the "meal" advocated by Doctor Cheney has the advantage of simplicity and freedom from technical difficulties. It also has the advantage of production of stimulation of the gastric mucosa to secretion which is essential to the interpretation of the information obtained.

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ELBRIDGE J. BEST, M. D. (384 Post Street, San Francisco)—In view of the fact that much valuable information can be learned from a study of the gastric chemistry and secretion, any method that simplifies the process of obtaining this information is most welcome to the investigator. Doctor Cheney is most timely in offering a technique that will appeal to the busy workers.

Since the adoption of the "fractional" gastric analysis in place of the old, single test of 1914 many curves have been plotted by workers in widely separated medical centers. Out of this mass of material we have come to recognize certain curves that give real information. We have also definitely learned that the actual percentage of acid means very little.

To be readily accepted by the medical public the curves from a new test must be properly compared with those from the old test. The various old test-meals give similarly shaped curves although the acid value differs in detail. If one uses the same patient, giving the same test-meal as, for instance the Ewald meal, he will find curves representing different concentrations but of the same shape. Doctor Cheney finds this also true when using his alcohol meal. Consequently his comparison of the alcohol meal with

the Ewald meal by Kohiyar's group of curves, which depends upon acid concentrations, is not justifiable.

I doubt if we will ever find a test that will allow us to draw any conclusions from the actual acid figures. Therefore to accept Kohiyar's hyperacid curve as that with HCl over sixty will only lead to confusion. I need only call attention to normal curves found by Rehfuss, some of his figures being over one hundred. Because of so many variables our interpretation of gastric content findings can only be on the basis of relativity.

There being so much information to be found in the second hour curve, which seems of more value to me than the first hour, I cannot agree at present with the author in discontinuing the test at sixty minutes. We should know if the curve ascends, remains on the same level or descends.

Confusion in medicine has come from different workers using different tests but making no fair comparisons with existing findings. This can be corrected by proper correlation under the same controls. Many gastro-enterologists having felt gastric analysis to be unreliable, have discarded the test. Lockwood, in 1923, tried to show, by an ingenious tube of three tips each in a different part of the stomach, that the acid figures varied to such an extent in the different parts of the stomach as to make the analysis unreliable. A review of his figures plotted in curves shows all curves to be of the same shape, thus strengthening the contention that gastric analysis properly studied can be of great value.

I feel we need several carefully plotted curves from the same person using food and alcohol meals for comparison. With such material from many people we will be able to interpret the findings of this new and simpler test in terms of what we already know of the stomach secretion through the older and accepted test-meals.

THE ASSOCIATION OF SUSCEPTIBILITY TO SCARLET FEVER AND ACUTE TONSILLITIS*

By ARTHUR L. BLOOMFIELD, M. D.
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DISCUSSION *by Karl F. Meyer, Ph. D., San Francisco; Edwin William Schultz, M. D., San Francisco; R. W. Burlingame, M. D., San Francisco.*

FOLLOWING the work of Dochez, Avery, and Lancefield,[1] who in 1919 developed practical methods for the biological classification of hemolytic streptococci, and who showed that these cocci could be separated into groups which were immunologically distinct, there has been an active revival of interest in the triad of hemolytic streptococcus diseases, namely, scarlet fever, acute follicular tonsillitis, and erysipelas.

The question of the rôle of streptococcus as the cause of scarlet fever, practically abandoned for many years, was promptly revived largely through the work of Bliss,[2] of Gordon,[3] and of Tunnicliff,[4] who showed that from the throats of scarlatina patients there could be recovered with great regularity hemolytic streptococci immunologically closely related or identical with one another, and different from the streptococci found in tonsillitis and in pyogenic infections. The final proof was soon brought by Dick and Dick[5] through the experimental production of scarlet fever in volunteers by swabbing the throat with cultures of streptococci derived from previous cases. Bloomfield and Felty[6] in the course of an investigation of acute tonsillitis found that this disease, which previously had been generally regarded as a nonspecific infection due to pyogenic cocci, pneumococci, or other organisms,[7] was also invariably caused by beta hemolytic streptococci. The evidence which led to this conclusion was the demonstration of the invariable presence of the streptococci in tremendous numbers in cultures made from the tonsils during the acute stages of the disease, and the observation that carriage of the organism in the tonsil was associated with resistance to reinfection which subsided when the carrier state ceased. It was not possible, however, to show that the "tonsillitis streptococci" fell into a sharply defined immunological group, although they differed from the scarlatinal strains. The streptococci of erysipelas, finally, have been studied by Birkhaug[8] and by Stevens and Dochez,[9] who find a close biological relationship between various strains. The entire subject has recently been reviewed by Stevens and Dochez,[10] and their work indicates a lack of complete specificity of the antigenic qualities of erysipelas and scarlatinal strains. In other words, while the scarlatinal strains are intimately related among themselves, as are the erysipelas strains, there are less close but still definite antigenic relationships between the scarlatinal, erysipelas, and pyogenic groups.

However, the main recent trend in the study of hemolytic streptococcus infection, stimulated by the practical objective of specific immunotherapy, has been along the lines of differentiation; and despite the obvious similarities of the organisms involved no particular attempts have been made to search for any common factors of susceptibility or resistance to scarlet fever, tonsillitis, and erysipelas.

The object of the present paper is to show that such common factors do exist at least with regard to susceptibility to tonsillitis and to scarlet fever.

CLINICAL SIMILARITIES IN SCARLET FEVER, ERYSIPELAS, AND TONSILLITIS

If one considers the clinical phenomena of scarlet fever, erysipelas, and tonsillitis, many points of fundamental similarity are found to exist, and they may be noted by way of introduction to the question of susceptibility.

1. The *incubation period* is of similar duration. The most accurate data on this point are from the experimental inoculations by Dick and Dick.[5 11] Following swabbing of the tonsils of volunteers with cultures of scarlatinal streptococci, symptoms began after approximately two days. Similarly tonsillitis occurred after an incubation period of thirty to seventy-two hours in a long series of volunteers into whose throats material containing hemolytic streptococci was introduced,[12] and in the case of epidemics of septic sore throat it has been observed that patients begin to fall ill within

* Read before the San Francisco County Medical Society, May 12, 1927.